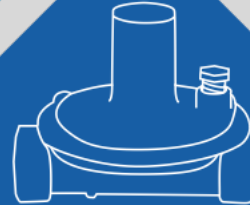
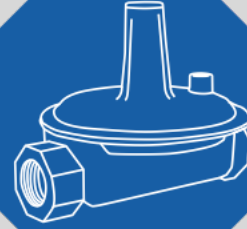
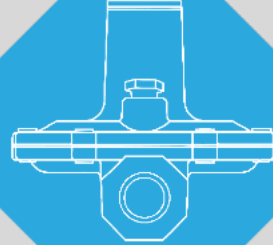

CERTIFIED LINE PRESSURE REGULATOR TRAINING



MAXITROL®

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 WARNING

Service and Installation must be performed by a trained/experienced service technician. All products used with combustible gas must be installed and used strictly in accordance with the instructions of the Original Equipment Manufacturer (OEM) and with all applicable government codes and regulations, e.g., plumbing, mechanical, and electrical codes and practices. These instructions do NOT supersede OEM's installation or operating instructions. All Maxitrol products should be installed and operated in accordance with Maxitrol Safety Warning Instructions.

Maxitrol Company is not responsible for any errors or omissions in reliance by anyone of any information set forth in this presentation without additional reference to local requirements and applicable ordinances or codes.

2 & 5 PSI PIPING SYSTEMS

- Street gas pressure is reduced to 2 or 5 psi using a utility supplied gas service regulator.
- The service regulator is located in an area where it can be vented to the outdoors.
- The gas is distributed throughout the structure using copper tubing or CSST to each gas appliance.
- The tubing or CSST can be sized to allow for significant pressure drop.
- The minimum operating inlet pressure to the line regulator should be approximately 1 psi when the appliance(s) is operating.



2 & 5 PSI PIPING SYSTEMS

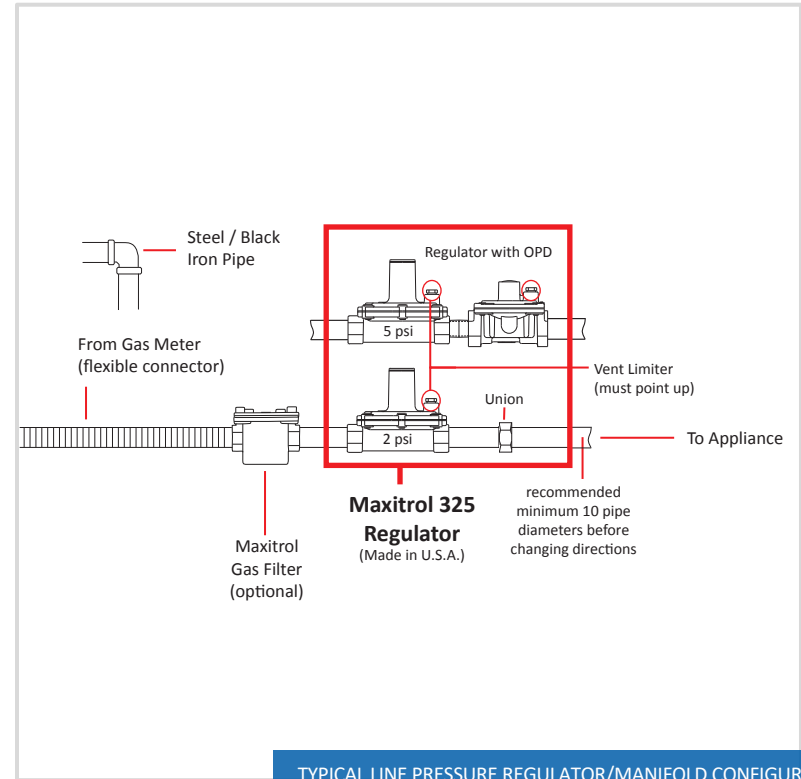
- The distribution pressure is greater than the rated inlet pressure of the gas appliance pressure regulator.
- An intermediate (line) pressure regulator reduces the pressure to within the appliance regulator's rated inlet pressure range while operating and maintains a reduced pressure during non-operating periods.
- Typical 2 and 5 psi piping systems use one line pressure regulator for each appliance or one line pressure regulator serving multiple appliances that are near one another.



CERTIFIED 325-L SERIES LINE PRESSURE REGULATORS

- Refer to National and Local Codes for Requirements.

NOTE: Install the regulator properly with gas flowing as indicated by the arrow on the casting



CERTIFIED 325-L SERIES LINE PRESSURE REGULATORS

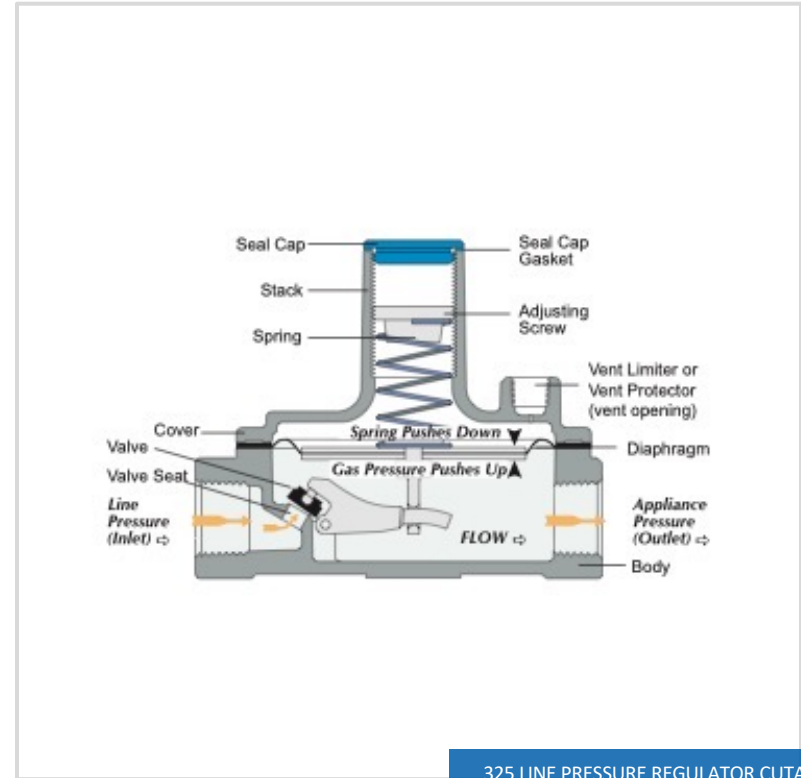
- ANSI Z21.80/CSA 6.22 is the standard for line pressure regulators suitable for application in natural, manufactured, mixed gases, liquefied petroleum gases and LP gas-air mixture piping systems.
- Maxitrol, in compliance with ANSI Z21.80/CSA 6.22, offers line pressure regulators for 2 psi and 5 psi piping systems.
- Maxitrol places a yellow sticker on the regulator stack identifying it as a certified gas line pressure regulator, and a yellow tag is attached to its vent limiter identifying it as a certified vent limiting device.



325-3L with 12A09 VENT LIMITING DEVICE

CERTIFIED 325-L SERIES LINE PRESSURE REGULATORS

- Design certified for 2 or 5 psi inlet pressures, ANSI Z21.80/CSA 6.22.
- Designed for dead end lock up.
- Not constructed with internal relief.
- Approved with V-limiter vent limiting device (regulators up to 2" NPT).
- 325-L series is suitable for multi-positional mounting with the exception of the 325-11L, which must be mounted in an upright horizontal position only.



325 LINE PRESSURE REGULATOR CUTAWAY

5 PSI PIPING SYSTEMS

- Maxitrol's 325-L series with overpressure protection devices (OPDs) are certified for 5 psi inlet pressure and 7 to 11 inches w.c. outlet pressure.
- 5 psi rated line pressure regulators require and OPD per ANSI Z21.80/CSA 6.22.
- The OPD must be integral or factory pre-assembled, approved and tested for use with the regulator to limit the downstream pressure to 2 psi maximum in the event of line regulator failure.

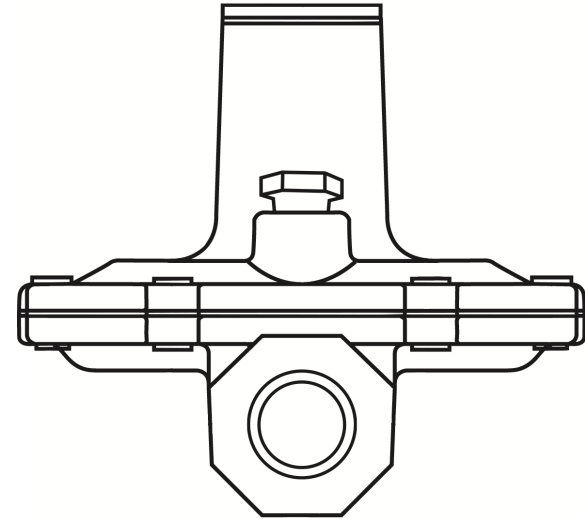
NOTE: Even though Maxitrol 5 psi line regulators with OPD are shipped as an assembly, it is important to check the pre-assembled pipe connection between the regulator and the OPD for leakage.



325-3L with OPD 48

5 PSI PIPING SYSTEMS

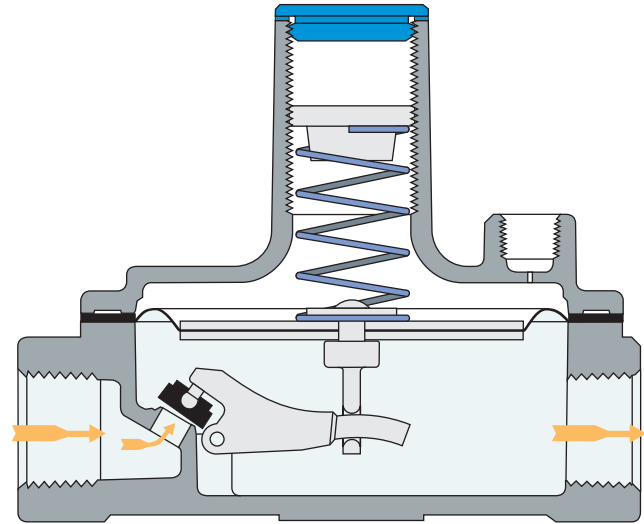
- The 325-L with OPD series is suitable for limited horizontal mounting (less than or equal to 90° from upright) with the exception of 325-11L, which must be mounted in an upright horizontal position only.
- If a vent limiter or vent protector is installed, mount in an upright horizontal position only.



REGULATOR IN UPRIGHT POSITION

DEAD END LOCKUP

- When an appliance shuts off, gas pressure downstream of the regulator attempts to equalize with upstream gas pressure.
- As the outlet pressure increases and begins to exceed the set point pressure, the regulator assumes its fully closed position (this is true for all Maxitrol regulators).
- Further increase in downstream pressure over set point pressure increases the valve-to-valve seat sealing force.

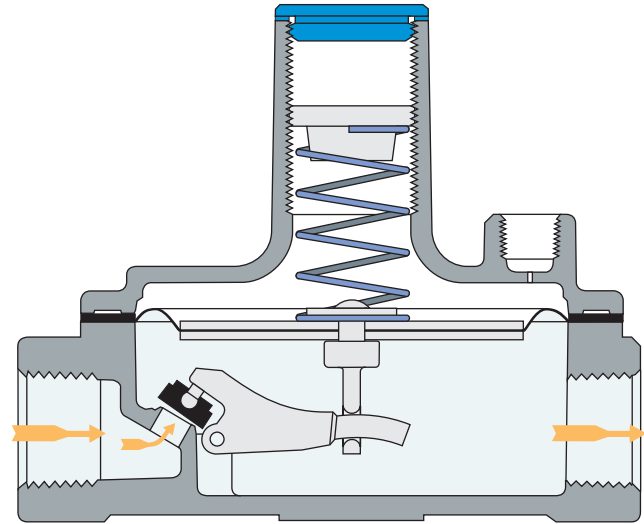


325 SERIES FEATURES A HIGH LEVERAGE LINKAGE ASSEMBLY

DEAD END LOCKUP

- Regulators capable of dead end lockup stop inlet to outlet pressure equalization and maintain an outlet pressure slightly above set point pressure under static conditions.
- Per ANSI/CSA standards, the maximum allowable lockup pressure is 150% of operating outlet pressure or operating outlet pressure plus 5" w.c., whichever is greater.

NOTE: If the regulator is undersized, incorrectly placed into service, improperly oriented, or mounted too far from the appliance, a higher than desired lockup pressure can occur. When introducing or restoring the gas supply to the line pressure regulator, open the manual valve slowly in the line supplying the line pressure regulator.



325 SERIES FEATURES A HIGH LEVERAGE LINKAGE ASSEMBLY

LINE PRESSURE REGULATOR VENTING - INDOORS

- Vent limiters are designed for use indoors to limit the amount of gas escapement in the unlikely event of a diaphragm failure. Gas escapement is limited to within the ANSI standard requirements.
- Maxitrol vent limiters used with Maxitrol regulators do NOT release or relieve gas into the environment during normal operation.
- Maxitrol's vent limiters should not be used outdoors if they are exposed to the elements.

NOTE: Maxitrol line pressure regulators DO NOT contain an internal relief function.

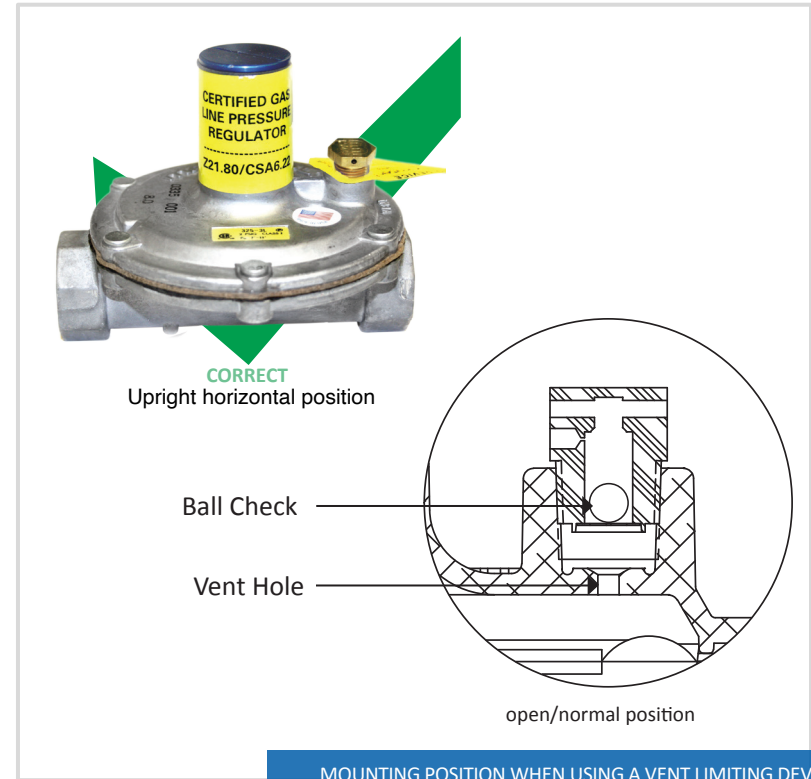


325-3L with 12A09 VENT LIMITING DEVICE

GAS PRESSURE REGULATOR VENTING - INDOORS

- When using a vent limiting device, the regulator must be mounted in an upright horizontal position only.

NOTE: A Maxitrol vent limiting device should only be installed in the Maxitrol regulator that it is certified with.

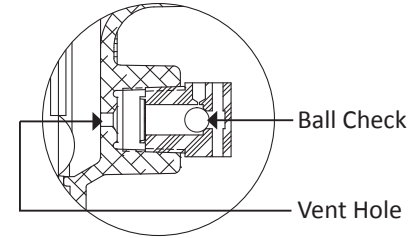


GAS PRESSURE REGULATOR VENTING - INDOORS

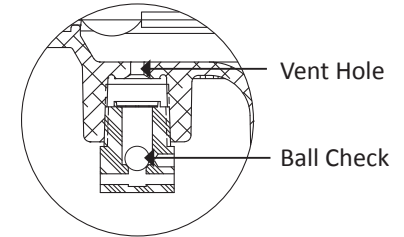
- Any orientation other than an upright horizontal position, will roll the ball check into the closed/limiting position.
- With the ball check in the closed/limiting position, the regulator may experience high lock-up and a sluggish response time and will not operate as designed.



INCORRECT
Sideways position



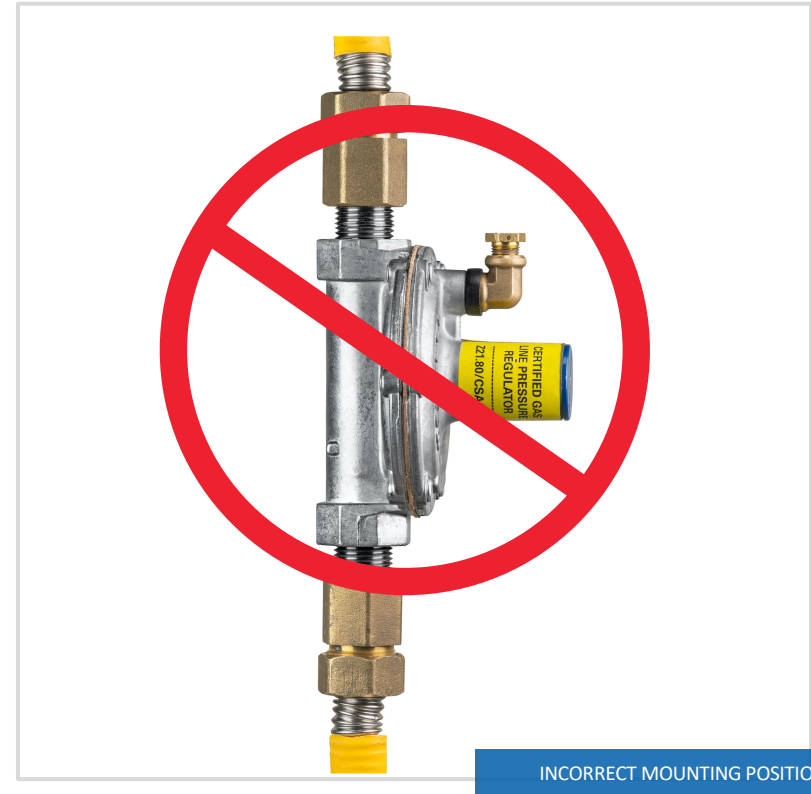
INCORRECT
Upside down position



INCORRECT MOUNTING POSITIONS

GAS PRESSURE REGULATOR VENTING - INDOORS

- Vent limiters must be threaded directly into the vent connection of the regulator without intermediate pipe or fittings.
- The Codes state you must follow the manufacturers' recommendations.



INCORRECT MOUNTING POSITION

VENT LIMITER MAXIMUM ALLOWABLE VENTING RATE

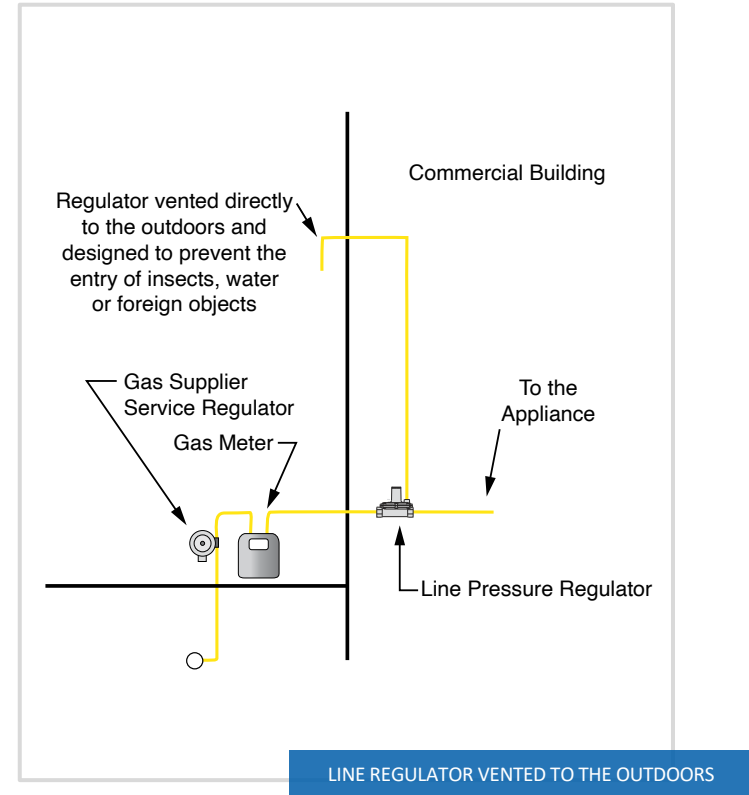
REQUIREMENTS FOR VENT LIMITING DEVICE	SPECIFIC GRAVITY	MAXIMUM ALLOWABLE FLOW RATE, CUBIC FEET PER HOUR (cm ³ /s)
Vent limiter for use only with natural, manufactured, mixed gases, and LP gas-air mixtures.	0.64	2.5 (19.6)
Vent limiter for use with liquefied petroleum gases.	1.53	1.0 (7.9)

NOTE: Maxitrol Vent limiting devices meet ANSI Z21.80/CSA 6.22. The requirements states “Vent Limiters shall be of materials having melting points of not less than 800°F (427° C).”

LINE PRESSURE REGULATOR VENTING – TO THE OUTDOORS

- The diaphragm must be allowed to breathe to the atmosphere for unrestricted movement. The regulator vent opening should never be restricted.
- Vent lines should be installed directly into the vent port connection.

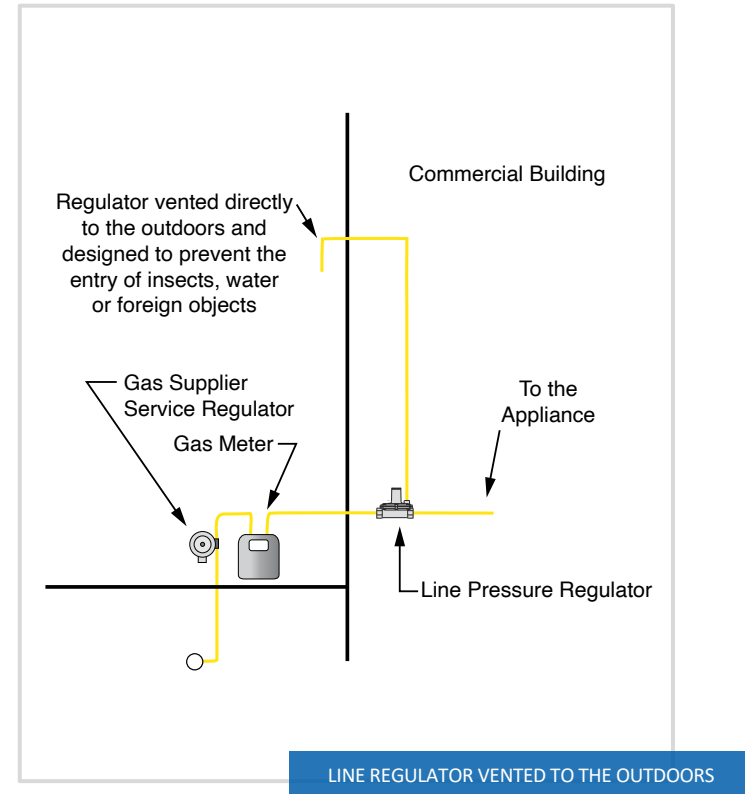
NOTE: Venting must be controlled in accordance with all applicable codes and regulations to avoid the danger of escaping gas should there be internal leakage. Venting systems are to be piped gas tight using approved thread joint compound. Be careful excess thread joint compound does not collect in or on the regulator vent, which could cause poor performance and interfere with lockup.



LINE PRESSURE REGULATOR VENTING – TO THE OUTDOORS

- Vent lines longer than 10 feet in length may require an increase to the next larger diameter to allow for free movement of air.
- Each regulator should have a separate vent line unless approved by code.
- Vent lines must remain open and protected against entry of foreign matter, including water.

NOTE: Venting must be controlled in accordance with all applicable codes and regulations to avoid the danger of escaping gas should there be internal leakage. Venting systems are to be piped gas tight using approved thread joint compound. Be careful excess thread joint compound does not collect in or on the regulator vent, which could cause poor performance and interfere with lockup.



LINE PRESSURE REGULATOR VENTING – OUTDOORS

- Maxitrol vent protectors are designed for outdoor applications to limit the entry of water, insects, or other foreign materials that could cause blockage or inhibit the vent function.
- Vent protectors must be mounted in an upright horizontal position only.
- Vent protectors are available for all regulators.

NOTE: Imblue® regulators have an anodized coating that increases corrosion resistance and provides extra protection against elements that cause aluminum to oxidize.



VENT PROTECTORS

LINE PRESSURE REGULATOR SIZING

SYSTEM REQUIREMENTS

- Gas Type
- Pipe Size
- Inlet Pressure (Maximum Static Pressure, Minimum Operating Pressure)
- Desired Outlet Pressure
- Maximum Capacity (Total Load – All appliances combined)
- Maximum Individual Load Capacity

In most cases, the manifold pipe size has already been selected based on good engineering practice and the regulator pipe size should conform to this size.



REGULATOR MODELS

LINE PRESSURE REGULATOR SIZING

CAPACITIES

Expressed in CFH (m³/h) @ 0.64 sp gr gas

MODEL	PIPE SIZE	OUTLET PRESSURE SET POINT	OPERATING INLET PRESSURE				
			.5 psi (3.4 kPa)	.75 psi (5.2 kPa)	1 psi (6.9 kPa)	1.5 psi (10.3 kPa)	2 psi (13.8 kPa)
325-3L	3/8" x 3/8" 1/2" x 1/2"	7" w.c. (1.7 kPa)	145 (4.1)	200 (5.7)	250 (7.1)	250 (7.1)	250 (7.1)
		10" w.c. (2.5 kPa)	110 (3.1)	180 (5.1)	230 (6.5)	250 (7.1)	250 (7.1)
325-5L	1/2" x 1/2"	7" w.c. (1.7 kPa)	360 (10.2)	485 (13.7)	500 (14.2)	500 (14.2)	500 (14.2)
		10" w.c. (2.5 kPa)	275 (7.8)	475 (13.5)	500 (14.2)	500 (14.2)	500 (14.2)

PRESSURE DROP

Expressed in CFH (m³/h) @ 0.64 sp gr gas

MODEL	7.0" w.c. (1.7 kPa)	.5 psi (3.4 kPa)	.75 psi (5.2 kPa)
325-3L	145 (4.0)	204 (5.8)	250 (7.0)
325-5L	400 (11.3)	550 (15.6)	670 (19.0)

LINE PRESSURE REGULATOR SIZING

To select a 325-L series regulator

KNOWN

- Appliance with two 100,00 Btu/h burners
- Pipe Size ½"
- Inlet Pressure: 2 psi static, 1 psi Operating
- Desired Outlet Pressure: 7" w.c.
- Maximum Individual load: 100,000 Btu/h
- Total Appliance Load: 200,00 Btu/h

SOLUTION

The 325-3L's capacity @ 1 psi operating inlet pressure is 250,000 Btu/h natural gas capacity. The maximum individual load for the 325-3L is 140,000 Btu/h.

The 325-3L (1/2") is the correct regulator to use with this application.



325-3L with 12A09 VENT LIMITING DEVICE

THANKS FOR LISTENING

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for more information.

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